UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAR 25 2014

Herschel T. Vinyard
Secretary
Florida Department of Environmental Protection
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Dear Secretary Vinyard:

The U. S. Environmental Protection Agency has completed its review of the site specific alternative criterion (SSAC) for nitrate for the Upper Wakulla River, Jackson Blue Spring, Merritts Mill Pond, Silver Springs, Silver Springs Group, Upper Silver River, Rainbow Springs Group and Rainbow Springs Group Run. Florida Department of Environmental Protection submitted the SSAC to the EPA on July 31, 2013, as new or revised water quality standards with the necessary certification by FDEP general counsel, pursuant to 40 CFR Part 131. The SSAC are site specific numeric interpretations of paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C.), referenced in paragraph 62-302.531(2)(a), F.A.C. FDEP submitted the numeric interpretation of the state narrative nutrient criterion for Waterbody Identification Numbers 1006, 180A, 180Z, 2772A, 2772C, 2772E, 1320A and 1320B expressed in the Upper Wakulla River, Jackson Blue Spring and Merritts Mill Pond Total Maximum Daily Load Report; Silver Springs, Silver Springs Group and Upper Silver River Total Maximum Daily Load Report and the Rainbow Springs Group and Rainbow Springs Group Run Total Maximum Daily Load Report as the SSAC. FDEP intends for the SSAC to serve as the numeric nutrient criterion for nitrate for the springs.

In accordance with section 303(c) of the Clean Water Act, I am hereby approving the SSAC for the Upper Wakulla River, Jackson Blue Spring, Merritts Mill Pond, Silver Springs, Silver Springs Group, Upper Silver River, Rainbow Springs Group and Rainbow Springs Group Run as the revised water quality standard for nitrate. Any other criteria applicable to these waterbodies remain in effect. Specifically as to nutrients, the nitrate-nitrite criterion for springs consistent with paragraph 62-302.531(2)(b)2., F.A.C., the total nitrogen and total phosphorus criteria for streams consistent with 62-302.531(2)(c), F.A.C. and any applicable federal criteria at 40 CFR Part 131.43(c)(1) and (3) continue to apply, as well as the requirements of paragraph 62-302.530(47)(a), F.A.C. The details of the SSAC are discussed in the enclosed documentation. We would like to commend you and your staff for your continued efforts in environmental protection for the State of Florida.

If you have any questions regarding the EPA's approval, please contact me at (404) 562-9345 or have a member of your staff contact Ms. Annie M. Godfrey, Water Quality Standards Section Chief at (404) 562-9967.

Sincerely,

James D. Giattina
Director
Water Protection Division

Enclosure

cc: Matthew Z. Leopold, FDEP
Daryll Joyner, FDEP

Decision Document for Hierarchy 1 Site Specific Alternative Criterion for Upper Wakulla River, Jackson Blue Spring and Merritts Mill Pond, Silver Springs, Silver Springs Group, and Upper Silver River and Rainbow Springs Group and Rainbow Springs Group Run

Summary Information

WBID	Description	Class	F.A.C.	Waterbody Type	Listing Parameter
1006	Upper Wakulla River	Class III Outstanding Florida Water (OFW)	62-304.300(2)	fresh	Biology, Dissolved Oxygen
180A 180Z	Jackson Blue Spring, Merritts Mill Pond	Class III, OFW	62-304.315(2)	fresh	Nutrients, Algal Mats
2772A 2772C 2772E	Silver Springs, Silver Springs Group, Upper Silver River	Class III, OFW	62-304.500(20)	fresh	Nutrients, Algal Mats
1320A 1320B	Rainbow Springs Group, Rainbow Springs Group Run	Class III, OFW	62-304.640(1)	fresh	Nutrients, Algal Mats

Nutrient Total Maximum Daily Loads (TMDLs) for the above eight named springs for the identified Water Body Identification number (WBIDs) were developed by the Florida Department of Environmental Protection (FDEP), pursuant to section 303(d) of the Clean Water Act (CWA). These TMDLs were developed to identify the level of nutrients that would prevent an imbalance of flora and fauna as required by the state's narrative nutrient criterion at paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C). FDEP determined that a monthly average of 0.35 mg/L of nitrate nitrogen (nitrate) would meet its narrative criterion and adopted the concentration as the TMDL value at subsections 62-304.300(2), 62-304.315(2), 62-304.500(20) and 62-304.640(1) F.A.C., on June 7, 2013. FDEP submitted the concentration from the TMDLs for EPA review as the hierarchy 1 site specific alternative nutrient criterion (SSAC) for the springs, pursuant to section 303(c) of the CWA and EPA's implementing regulations at 40 CFR Part 131. This decision document approves the SSAC for the nitrate concentration of 0.35 mg/L not to be exceeded as a monthly average as the hierarchy 1 criterion for the eight spring segments identified above. Any other criteria applicable to these waterbodies remain in effect. Specifically, as to nutrients, the nitrate-nitrite criterion for springs consistent with paragraph 62-302.531(2)(b)2., F.A.C., the total nitrogen and total phosphorus criteria for streams consistent with 62-302.531 (2)(c), F.A.C. and any applicable federal criteria at 40 CFR 131.43(c)(1) and (3) continue to apply, as well as the requirements of paragraph 62-302.530(47)(a), F.A.C.

In a letter dated July 31, 2013, from Matthew Z. Leopold, General Counsel for FDEP, to A. Stanley Meiburg, Acting Regional Administrator of EPA's Region 4 Office, FDEP submitted the numeric interpretation of the state narrative nutrient criterion as expressed in the Upper Wakulla River, Jackson Blue Spring, Merritts Mill Pond, Silver Springs, Silver Springs Group, Upper Silver River, Rainbow Springs Group and Rainbow Springs Group Run TMDLs as the SSAC for WBIDs 1006, 180A, 180Z, 2772A, 2772C, 2772E, 1320A and 1320B. This SSAC serves as the primary site specific interpretation of Florida's narrative water quality criterion for nutrients set out in paragraph 62-302.530(47)(b), F.A.C., in accordance with paragraph 62-302.531(2)(a), F.A.C. Pursuant to section 303(c) of the CWA, the revised water quality standard is subject to review and approval by the EPA since FDEP intends for the SSAC to serve as the numeric nutrient criterion for nitrate for the springs and WBIDs identified in the table above. In the July 31, 2013, letter, FDEP General Counsel certified that the revised water quality standard was duly adopted pursuant to Florida law.

The EPA's decision to approve the criterion is subject to the results of consultation under section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service. By approving the standards "subject to the results of consultation," the EPA retains its discretion to take appropriate action if the consultation identifies deficiencies in the standards requiring remedial action by the EPA. The EPA will notify FDEP of the results of the section 7 consultation upon completion of the action.

Description of waters for which the SSAC have been proposed

The Wakulla River watershed is located within portions of southern Georgia and Leon and Wakulla Counties, Florida. The Wakulla River watershed which is approximately 1,165 square miles includes the Wakulla Springshed (see map on page 5). Wakulla Spring is the primary source of the Wakulla River. The Wakulla River is about 9 miles long, starting near Camp Indian Springs and joining the St. Marks River near Fort San Marcos. Major centers of population within the St. Marks Basin include Tallahassee, Woodville, Crawfordville and St. Marks.

Jackson Blue Spring and Merritts Mill Pond are located in Jackson County, approximately 4.2 miles east of the city of Marianna (see map on page 6). Jackson Blue Spring forms the headwaters of the 270-acre Merritts Mill Pond, which was once the upper portion of a free-flowing spring run prior to 1860. In the 1920s, Merritts Mill Pond was expanded to its current extent with the construction of a dam and weir structure at U.S. Highway 90. The impounded Merritts Mill Pond now forms the headwaters of Spring Creek, a tributary to the Chipola River. The Chipola River is the largest tributary in Florida to the Apalachicola River.

Silver Springs, Silver Springs Group and the Upper Silver River are located in the Silver River State Park which is located in Marion County, Florida, east of the city of Ocala (see map on page 7). Silver Springs is the uppermost segment of the Silver River and contains the largest spring in the system, Silver Main Spring. Silver Main Spring is historically the largest nontidal spring in Florida by volume. On average, about 45% of flow in the Silver River is from Silver Main Spring. The Silver Springs Group is the segment of the Silver River downstream from Silver Springs that contains at least 3 other major springs, 26 other named springs and numerous smaller, unnamed springs that contribute flow and nutrients to the system. Silver Springs and

Silver Springs Group form the headwaters of the Silver River, which flows eastward approximately 5 miles to the Ocklawaha River.

Rainbow Springs Group and Rainbow Springs Group Run are located in Marion County, Florida, north of the city of Dunnellon (see map on page 8). Rainbow Springs Group is the uppermost segment of the Rainbow River and contains numerous springs discharging from limestone crevices and sand boils. It is located in Rainbow Springs State Park. Rainbow Springs Group is the fourth largest spring group (by magnitude) in Florida, with an average flow of 456 million gallons per day. The 2 largest springs in the group are Rainbow Spring #1 in Rainbow Springs State Park, and Rainbow Spring #4, which is located about 50 feet downstream. Rainbow Springs Group Run is a segment of the Rainbow River downstream from Rainbow Springs Group that contains 2 other major springs, Rainbow #6 and Bubbling Spring. Rainbow #6 is located about 0.4 miles downstream from the head of the river and Bubbling Spring is located about 200 feet downstream from Rainbow #4. Spring discharge in these 2 segments provides most of the flow in the Rainbow River. Numerous smaller springs discharge to the river contributing flow and nutrients to the system for its entire southward journey of approximately 5.7 miles to the Withlacoochee River.

Discussion of how the concentration was derived

Based on several lines of evidence, nitrate was identified as the primary factor causing the elevated growth of algae. Nuisance accumulations of Vaucheria occurred at nitrate-nitrite concentrations at or above 0.454 mg/L. Nitrate concentrations lower than 0.441 mg/L are considered protective in maintaining periphyton cell density and biomass at baseline conditions. An appropriate target should include a margin of safety to address uncertainty, as well as to sustain environmental conditions below the imbalance point. In the change-point analysis for mean cell density, the mean nitrate concentration was 0.441 mg/L, with the test statistic of 7.68 and confidence level over 95%. The 95% confidence interval for the change point was between 0.378 and 0.629 mg/L nitrate. The change-point analysis provides a concentration of nitrate at which change (excessive algal growth) occurs.

The TMDL target must be established at a level that prevents a negative biological change, which in this case is excessive algal growth. Due to the fact that the change in algal growth occurs between 0.378 and 0.629 mg/L of nitrate, the TMDL threshold must be established below that interval to be protective of the resource. While the change-point analysis showed that the change in periphyton was related to nitrate, the next step was to determine the relationship of nitrate concentration to periphyton. The exponential relationship between nitrate and periphyton cell density is used to define a nitrate target that prevents change. The primary approach to finding a nitrate target utilized a periphyton cell density change point and upper confidence interval. The change point was identified at 0.441 mg/L nitrate and the concentration prior to the change point yielded nitrate measurements between 0.33 and 0.38 mg/L nitrate. By taking the lower cell density at the change point of 0.441 mg/L, FDEP targeted a more conservative condition in these waterbodies. This target includes a margin of safety that addresses uncertainty by sustaining the environmental concentrations that are below the imbalance point. In the studies utilized for the spring TMDLs, both nitrate and/or nitrate-nitrite concentrations were analyzed and reported and a final monthly average nitrate concentration was adopted for the springs. The state criterion for nitrate-nitrite for springs at paragraph 62-302.531(2)(b)2., F.A.C includes both

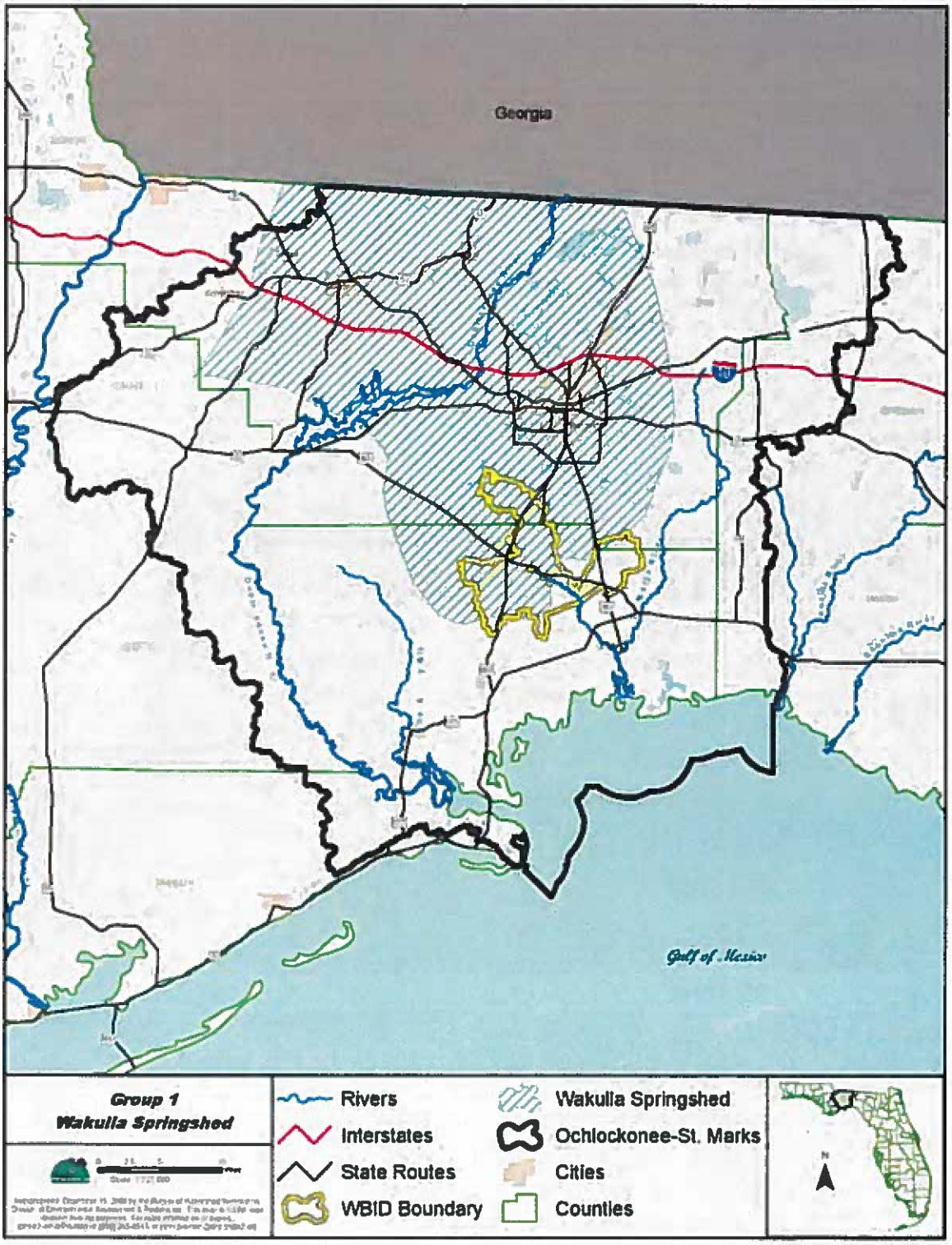
nitrate and nitrite even though the nitrite contribution is considered somewhat insignificant. A monthly average is considered to be the appropriate time frame, as the periphyton dataset was based on a 28-day deployment and the response of algae to nutrients is on the order of days to weeks. Based on the information from these studies, a final monthly average nitrate concentration of 0.35 mg/L is considered protective of the spring systems and will maintain a balance in the aquatic flora or fauna of Upper Wakulla River, Jackson Blue Spring, Merritts Mill Pond, Silver Springs, Silver Springs Group, Upper Silver River, Rainbow Springs Group and Rainbow Springs Group Run.

Consideration of the TMDL concentration as the SSAC value

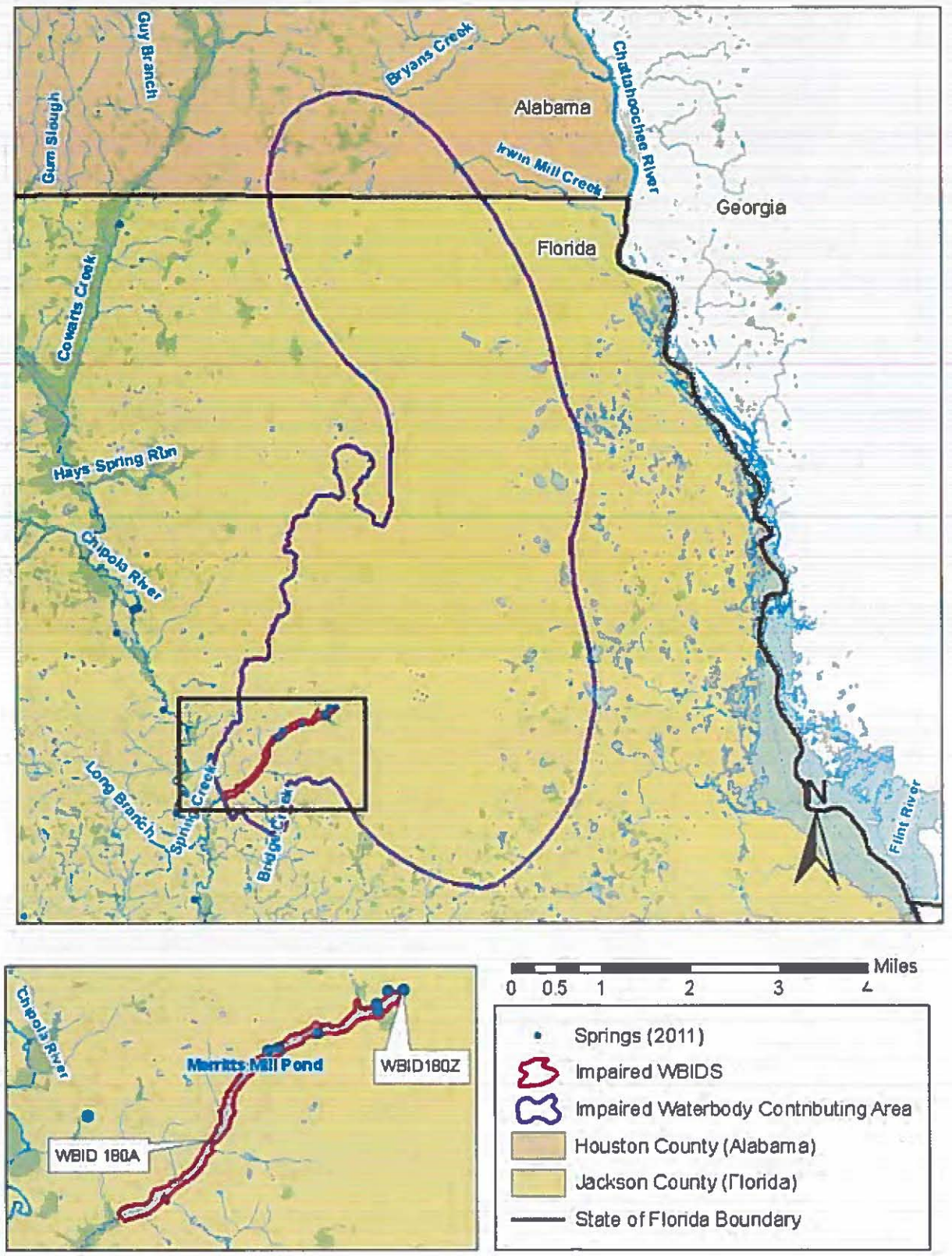
The TMDL concentration target for the WBIDs referenced in the table on page 1 for nitrate is set at a monthly average of 0.35 mg/L. This nitrate concentration was established based on several lines of evidence, including laboratory nutrient amendment bioassays; comparing metabolic rates, specifically ecological efficiency of aquatic communities; examining the ecological condition of algae and nutrients in the Florida Springs Report; and examining the relationship between periphyton biomass and cell density and the nitrate concentration in the Upper Wakulla River, Jackson Blue Spring, Merritts Mill Pond, Silver Springs system and Rainbow Springs system. The approaches used for the TMDLs were appropriate for ensuring protection of water quality and aquatic life and will maintain a balance in the aquatic flora or fauna of the springs.

Conclusion

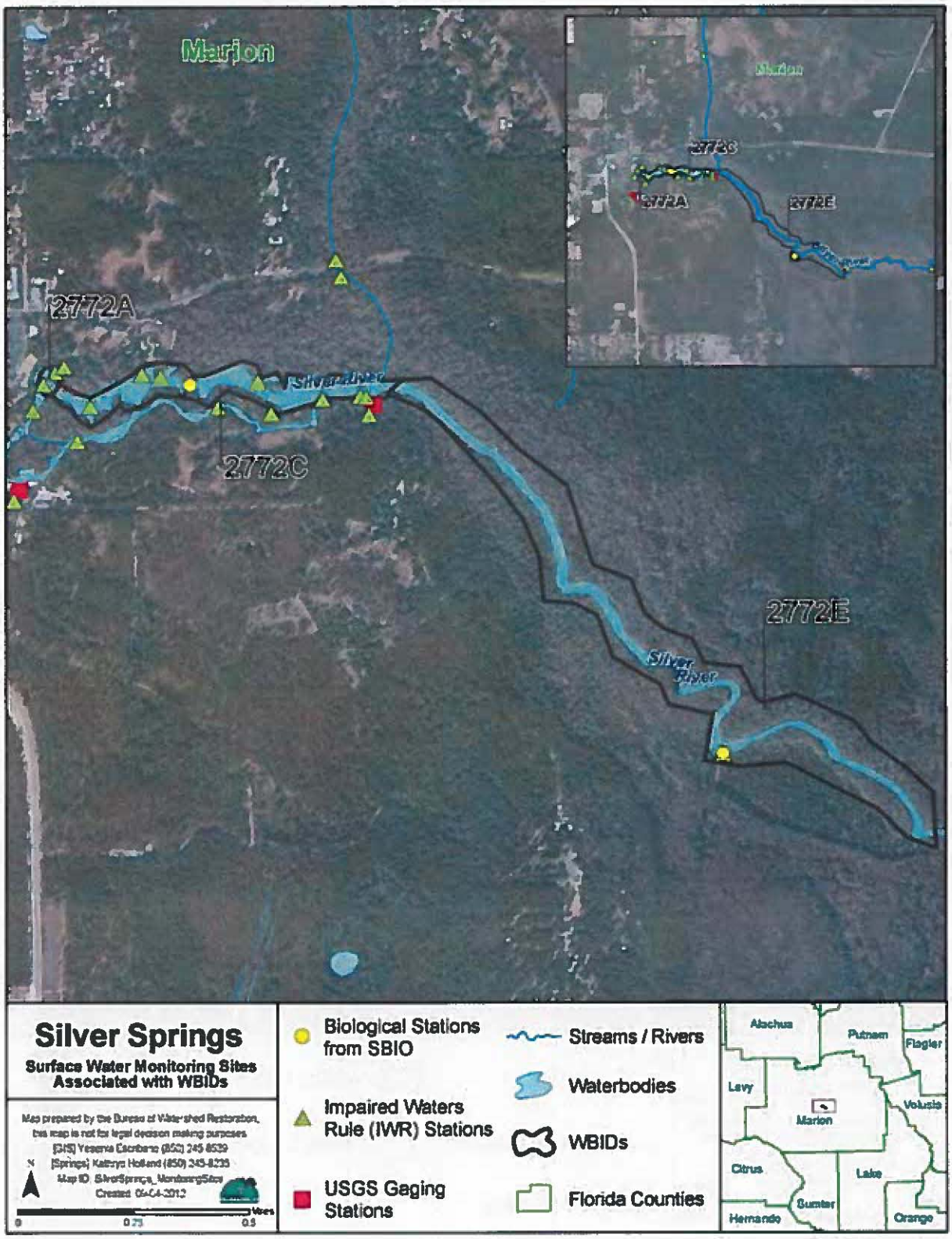
Based on the chemical, physical and biological data presented in the development of the SSAC, the EPA concludes that the SSAC of 0.35 mg/L as a monthly average, for nitrate established for the springs and WBIDs identified in the table above protects healthy, well balanced biological communities in the waters to which the SSAC applies and is consistent with the CWA and its implementing regulations. More specifically, the SSAC is consistent with both 40 CFR 131.11(b)(1)(ii) and the EPA's 304(a) guidance on nutrient criteria. FDEP did not address downstream protection in these TMDLs. Paragraph 62-302.531(4) will apply to these WBIDs in conjunction with the hierarchy l SSAC to ensure attainment and maintenance of water quality standards of downstream waters, in accordance with 40 CFR 131. In accordance with section 303(c) of the CWA, the SSAC for the nitrate concentration of 0.35 mg/L not to be exceeded as a monthly average as the hierarchy 1 criteria for the eight spring segments identified above is hereby approved as consistent with the CWA and 40 CFR Part 131.



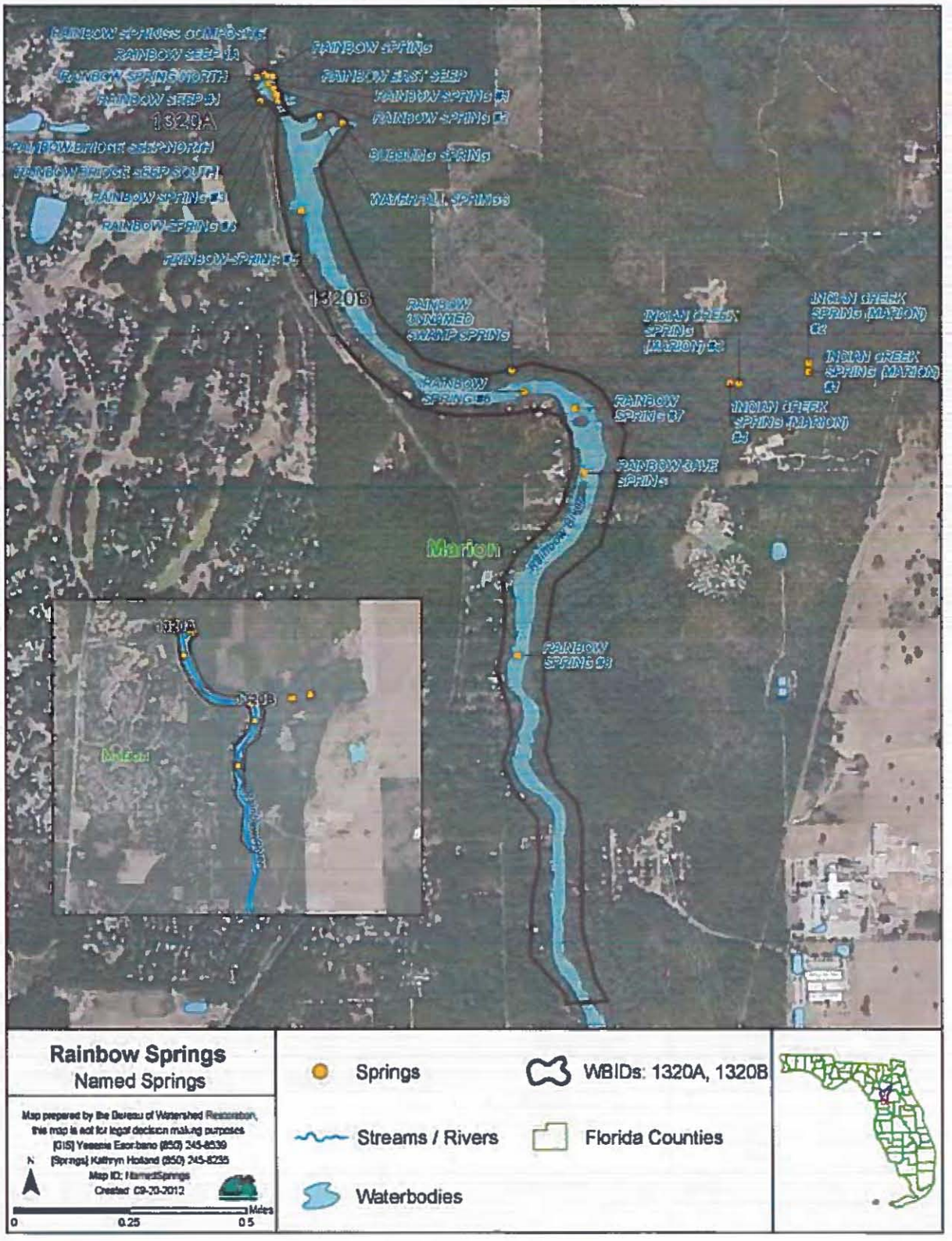
Upper Wakulla River WBID 1006



Blue Spring WBID 180Z and Merritts Mill Pond WBID 180A and Spring Contributing Area



Silver Springs Map showing WBIDs 2772A, 2772C and 2772E



Rainbow Springs Map showing WBIDs 1320A and 1320B